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EXAMINER	
MILLER HARRIS, AMBER R	
ART UNIT	PAPER NUMBER
1797	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,149	RUBAS, PAUL J.	
	Examiner	Art Unit	
	AMBER MILLER HARRIS	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/27/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-4, 7, 8, 13-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dannström et al. WO 01/66231 in view of Yamamori et al. US 5,922,201.

4. Regarding claim 1, the Dannström et al. reference discloses a module for separating a multi-component fluid comprising: a hollow shell having a hermetic enclosure (figure 3, object 4); a plurality of separation assemblies in side by side relationship disposed in the shell; each separation assembly comprising a plurality of elongated membrane elements (figure 2a object 1a), at least a portion of each membrane element comprising a semi permeable surface to permit selective permeation of one or more components of the multi- component fluid into the membrane

element (page 10, lines 1-14); the shell having at least one inlet conduit for introducing the multi-component fluid into the shell for treatment at a first pressure and at least one exit conduit for passage of treated multi-component fluid out of the shell; and at least one exit conduit for passage of permeate at a second pressure being lower than the first pressure from one of the manifolds out of the shell (page 12, lines 8-17). The reference does not disclose one end of the membrane elements in a separation assembly being attached to and hermetically sealed to an inlet manifold and the opposing end being attached to and hermetically sealed to an outlet manifold, at least one of the manifolds being unrestrained, thereby permitting axial movement of each membrane element in response to temperature changes, and at least one manifold from each separation assembly being in fluid communication with a manifold from one other separation assembly, the plurality of separation assemblies being in fluid communication with each other.

5. The Yamamori et al. reference discloses one end of the membrane elements in a separation assembly being attached to and hermetically sealed to an inlet manifold and the opposing end being attached to and hermetically sealed to an outlet manifold, and at least one manifold from each separation assembly being in fluid communication with a manifold from one other separation assembly, the plurality of separation assemblies being in fluid communication with each other (figure 7, objects 1, 3 and 9 and figure 11 object 1). The reference does not explicitly state at least one of the manifolds being unrestrained. It would be obvious to one having ordinary skill in the art at the time the

invention was made that the manifold of figure need not be restrained because once in the vessel, would only need the support of inlet and outlet object 9.

6. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Dannström et al. reference to include one end of the membrane elements in a separation assembly being attached to and hermetically sealed to an inlet manifold and the opposing end being attached to and hermetically sealed to an outlet manifold, at least one of the manifolds being unrestrained, thereby permitting axial movement of each membrane element in response to temperature changes, and at least one manifold from each separation assembly being in fluid communication with a manifold from one other separation assembly, the plurality of separation assemblies being in fluid communication with each other (Yamamori et al. figure 7, objects 1, 3 and 9 and figure 11 object 1) because this provides continuous communication between the membranes and a outlet for the permeate.

7. For claim 2, the Dannström et al. reference discloses the shell is generally cylindrical having an axial length (figure 3, object 4).

8. For claim 3, the Dannström et al. reference discloses the plurality of membrane elements are membrane tubes that are substantially parallel to the axial length of the shell (figure 2a object 1).

9. For claim 4, the Dannström et al. reference discloses an additional conduit for the passage of an additional fluid (sweep gas), from outside the shell into the apparatus (figure 5, object 9a). The reference does not disclose the passage of the gas into the manifold.

10. The Yamamori et al. reference discloses the passage of the gas into the manifold (figure 7, object 1).

11. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Dannström et al. reference to include the passage of the gas into the manifold (Yamamori et al. figure 7 object 1) because this provides communication between each of the membranes in order to remove the permeate fluid.

12. For claim 7, the Dannström et al. reference discloses a sealing material that is substantially leak proof to the multi-component fluid at least partly occupies the space between the exit conduit of the permeate and the shell (page 15, lines 24-33).

13. For claim 8, the Dannström et al. reference discloses spacer members between and spacing each adjacent separation assembly (figure 2a object 1c).

14. For claim 13, the Dannström et al. reference discloses cylindrical shell has oblate ends (figure 3, object 4).

15. For claim 14, the Dannström et al. reference does not explicitly state the first pressure is above 1,200 psia.

16. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Dannström et al. reference to include the first pressure is above 1,200 psia, since a pressure vessel is being used and should be able to withstand a specified pressure (page 5, lines 25-27).

17. For claim 15, the Dannström et al. reference discloses at least a portion of the shell is made of a first material and at least a portion of each membrane element is

made of a second material the first and second materials having different coefficients of thermal expansion (page 2, lines 31-32 and page 5, line 2 (Witzko et al. column 2, lines 53-55)).

18. For claim 17, the Dannström et al. reference discloses a module for separating a multi-component fluid comprising: a chamber-defining, cylindrical shell having oblate end sections formed integrally with the cylindrical portion (figure 3, object 4), at least a portion of the shell being formed of a first material (page 2, lines 31-32); a plurality of stacked separation assemblies in side by side relationship disposed in the shell; each separation assembly comprising a plurality of elongated, substantially parallel, membrane elements (figure 2a object 1a), at least a portion of each membrane element comprising a wall being adapted to separate the multi-component fluid into permeate and retentate streams (page 10, lines 1-14), at least a portion of the membrane being formed of a second material (page 5, line 2 (Witzko et al. column 2, lines 53-55)), said first and second materials having different coefficients of thermal expansion the shell having a first inlet conduit for introducing the multi-component fluid into the shell for treatment at a first pressure and a first exit conduit for passage of treated multi-component fluid out of the shell (page 12, lines 8-17); and the shell having a second inlet conduit for introducing a sweep gas into the second manifold and a second outlet for passage of permeate from the first manifold out of the shell (figure 5, object 9a). The reference does not disclose one end of each membrane element being attached to and hermetically sealed to a first manifold and the opposing end of each membrane element being attached to and hermetically sealed to a second manifold, one or both the first

and second manifolds being unrestrained in the axial direction of the shell; and the first manifold of one separation assembly being in fluid communication with the first manifold of an adjacent separation assembly and the second manifold of one separation assembly being in fluid communication with the second manifold of an adjacent separation assembly, whereby the plurality of separation assemblies are in fluid communication with each other.

19. The Yamamori et al. reference discloses one end of each membrane element being attached to and hermetically sealed to a first manifold and the opposing end of each membrane element being attached to and hermetically sealed to a second manifold, and the first manifold of one separation assembly being in fluid communication with the first manifold of an adjacent separation assembly and the second manifold of one separation assembly being in fluid communication with the second manifold of an adjacent separation assembly, whereby the plurality of separation assemblies are in fluid communication with each other (figure 7, objects 1, 3 and 9 and figure 11 object 1). The reference does not explicitly state at least one of the manifolds being unrestrained. It would be obvious to one having ordinary skill in the art at the time the invention was made that the manifold of figure need not be restrained because once in the vessel, would only need the support of inlet and outlet object 9.

20. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Dannström et al. reference to include one end of each membrane element being attached to and hermetically sealed to a first manifold and the opposing end of each membrane element being attached to and hermetically

sealed to a second manifold, one or both the first and second manifolds being unrestrained in the axial direction of the shell; and the first manifold of one separation assembly being in fluid communication with the first manifold of an adjacent separation assembly and the second manifold of one separation assembly being in fluid communication with the second manifold of an adjacent separation assembly, whereby the plurality of separation assemblies are in fluid communication with each other (Yamamori et al. figure 7, objects 1, 3 and 9 and figure 11 object 1) because this provides continuous communication between the membranes and a outlet for the permeate.

21. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dannström et al. WO 01/66231 and Yamamori et al. US 5,922,201 as applied to claim 1 above, and further in view of Jitariouk WO 1999/26717 (Translation provided by Jitariouk US 6,613,231).

22. For claim 5, the Dannström et al. reference does not disclose the separation assemblies are stacked in a disk-like configuration.

23. The Jitariouk reference discloses the separation assemblies are stacked in a disk-like configuration (figure 1, object 11).

24. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Dannström et al. reference to include the separation assemblies are stacked in a disk-like configuration (Jitariouk figure 1, object 11) because the disk is an obvious design choice and allows the user to change the shape of the apparatus.

25. For claim 6, the Dannström et al. reference discloses an additional conduit for passage of sweep gas from the outside the shell into one of the manifolds (figure 5, object 9a).

26. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dannström et al. WO 01/66231 and Yamamori et al. US 5,922,201 as applied to claim 1 above, and further in view of Abe et al. US 4,689,150.

27. For claims 9 -11, the Dannström et al. reference does not disclose the membrane element comprises a semi-permeable membrane layer formed on a microporous support tube, the membrane layer is formed from a porous silica and the membrane layer has a pore size ranging from about 0.1 Å to about 10 Å.

28. The Abe et al. reference discloses the membrane element comprises a semi-permeable membrane layer formed on a microporous support tube, the membrane layer is formed from a porous silica and the membrane layer has a pore size ranging from about 0.1 Å to about 10 Å (column 2, lines 5-22).

29. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Dannström et al. reference to include the membrane element comprises a semi-permeable membrane layer formed on a microporous support tube, the membrane layer is formed from a porous silica and the membrane layer has a pore size ranging from about 0.1 Å to about 10 Å (Abe et al. column 2, lines 5-22) because this provides greater separation of selected fluids.

30. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dannström et al. WO 01/66231 and Yamamori et al. US 5,922,201 as applied to claim 1 above, and further in view of Prasad et al. US 5,352,361.

31. For claim 12, the Dannström et al. reference does not disclose a plurality of baffles are disposed substantially perpendicular to at least one of the membrane elements and are effective to distribute multi-component fluid across the outer surface of the membrane elements.

32. The Prasad et al. reference discloses a plurality of baffles are disposed substantially perpendicular to at least one of the membrane elements and are effective to distribute multi-component fluid across the outer surface of the membrane elements (figure 3, objects 3a, 3b and 10).

33. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Dannström et al. reference to include a plurality of baffles are disposed substantially perpendicular to at least one of the membrane elements and are effective to distribute multi-component fluid across the outer surface of the membrane elements (Prasad et al. figure 3, objects 3a, 3b and 10) because this ensures that the fluid comes into contact with the membranes.

34. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dannström et al. WO 01/66231, Yamamori et al. US 5,922,201 and Abe et al. US 4,689,150 as applied to claim 9 above, and further in view of Yoshikawa et al. US 6,503,294.

35. For claim 16, the Dannström et al. reference does not disclose the membrane layer is formed from a zeolite.

36. The Yoshikawa et al. reference discloses the membrane layer is formed from a zeolite (column 12, lines 6-9).

37. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Dannström et al. reference to include the membrane layer is formed from a zeolite (column 12, lines 6-9) to improve the separation of gases from a fluid stream.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMBER MILLER HARRIS whose telephone number is (571)270-3149. The examiner can normally be reached on Mon-Thur (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on (571) 272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AH

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797